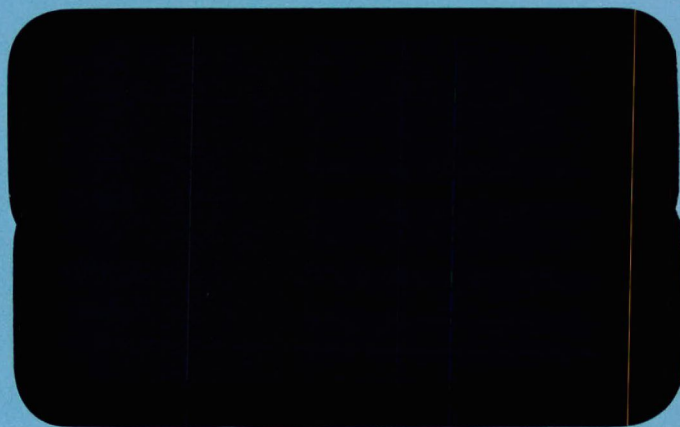




COMMISSION ON EDUCATIONAL PLANNING



POSITION PAPER

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TEACHING, LEARNING AND EVALUATION

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CONTENTS

	PAGE
Teaching	4
Learning	10
Evaluation	17
Implications	22
Bibliography	29

TEACHING, LEARNING AND EVALUATION

If there is a single word that sums up what is happening in the world around us today, that word is "revolution." Those who are enthusiastic about changes in the educational process have been predicting that a revolution is about to take place here too. To this end they recommend sweeping changes in the educational system, often without reference to reality or evidence. Be that as it may, there is no doubt that changes are imminent, even in one of the most conservative of all institutions, the educational system.

Now, to predict what will be in the next 30 years is a somewhat dangerous task. It is difficult enough to describe what is current, let alone predict what will be the case in a system which is becoming increasingly diverse both in terms of what it must accomplish for its clients and the methods by which this will be achieved. This problem is exacerbated by the fact that our own ideals and biases tend to creep into the picture. These ideals tend to color our view of what is currently true and may lead to the development of a number of self-fulfilling hypotheses which in turn become confused with changes that should be made as we progress through the decades to come. At the very least we can build in checks for testing and evaluating those processes we hold a priori to be effective. Since some plan is better than none at all, it seems useful to do three things:

1. Delineate those current trends in the society which influence what is being attempted in the schools.
2. Indicate the ways in which these trends interact with the school situation to produce certain kinds of in-

stitutional behavior and outcomes related to teaching, learning and evaluation.

3. Suggest possible problems which may arise as a result of pressures for change.

Let me begin, then, by reiterating those trends in education and society which will most likely determine what the teaching-learning process will be like in the future. No attempt will be made here to organize them into any kind of hierarchy.

1. The schools of the future will seek ways to de-emphasize conformity.

When people collect in any kind of group, the trend is to conformity. If the schools desire to build up student-centered curricula and individualized instruction, this trend must somehow be controlled.

2. Students will have increasing responsibility for designing their own educational experiences.

This trend has come about through the institution of the problem-centered curriculum and an effort on the part of the schools to make content relevant. If such content is to be relevant, it must be individualized.

3. There is a possibility that the school will relinquish its right as the sole institution devoted to passing on the collected wisdom of the culture.

This trend is well underway in the United States where the expansion of knowledge and the increase in the length of the educational process has literally overwhelmed the school system. It is possible, however, that in Canada the schools can continue to serve the needs of all by continuously adjusting to meet these needs.

4. Technological advances and the invention of new media will immediately affect the role of the teacher as will the introduction of para-professional help.

It is possible that the failure of many innovations in the school system is due not so much to their lack of merit as to the inability of teachers to adjust their roles to meet the new needs created by these innovations.

5. The education of the very young will be increasingly emphasized.

This emphasis is bound to follow because of the belief in the modifiability of the young and the evidence

that many problems, which require remediation later, have their genesis in this period of development.

6. The length of time spent in school or in some form of post-public school education will increase.

To meet the divergent needs of these students it will be necessary to set up much more complex organizations in which the classroom unit as it now exists will play a minor role and in which the school itself will need to expand its facilities to meet a variety of needs.

7. The role of the expert evaluator will be expanded.

As more educational programs are developed to meet the needs of individual students, it will become necessary to make a variety of judgments as to the effectiveness of these programs. This will require comparative data and careful evaluation in order that appropriate decisions may be made.

8. Increasing knowledge about the effect of drugs on learning is being produced.

Should current predictions hold, a whole new world may be opening in education--one which may produce great benefits but which may also produce irreparable harm if not controlled.

9. Militating against some of these trends will be an increasing demand for the schools to account for the cost of education.

It is clear that spending for education cannot be escalated indefinitely without reference to quality. It is equally clear that trends such as the individualization of instruction and the lengthening of the time spent in school will cost a great deal of money. Some balance between the two will be demanded.

It is, of course, possible that trends which appear to be contradictory will by some means become harmonized without intervention. History does not support this kind of faith. It is more likely that serious errors will occur unless careful judgment and ongoing evaluation are continuously applied to the decisions made in education.

Teaching

A comprehensive description of what teaching is has largely eluded researchers up to this time. Early approaches to assessing teaching centered on the teacher as "knower" or scholar. This conception is seriously faulty because, as we all know, there is a good deal more to teaching than just knowing the subject matter. If teaching in any sense is to become a science, then other factors in addition to subject mastery must be considered.

Combs (1965) describes another approach to studying teacher effectiveness in which teaching is viewed as competence. Earlier studies based on this approach attempted to list the traits that a good teacher would display. Combs refers to a conference held in 1962 where a group of "super teachers" were asked to make a list of the competencies a teacher should possess. The list which he gives ranges from qualities such as knowing subject matter and being adaptable to having a belief in God. Research, however, has been unable to demonstrate the relationship between these traits and good teaching.

Another competencies approach takes up the problem in a more wholistic way and is illustrated by the research carried out by Marie M. Hughes (1959). She was able to demonstrate that some general classes of teacher behavior such as controlling, imposition and facilitating could be related to what was conceived to be good teaching. In this sense, the wholistic approach appears to be more fruitful, but even these findings do not help us a great deal in preparing and evaluating teachers.

Combs (1965) himself comes to the conclusion that the personal qualities of the teacher are the important factors in the teaching-learning process and that changes leading to the improvement of the system will come about only as we change the teachers themselves. We must, then, concentrate on developing the teacher-as-human in our training program. This may, in fact, be the turn that research will take in the future. Work such as that of Washburne and Heil (1960), though still in its early stages, already indicates the possibility of matching teachers and pupils on the basis of intellectual and emotional qualities and needs.

Smith (1960), after concluding that: (a) any effort to apply scientific or philosophical knowledge directly to teaching would fail; (b) that teaching does not necessarily entail learning; (c) that teaching and talking are not incompatible; and (d) that actual classroom teaching does not conform to methods described in textbooks, decided to study only the procedural means by which teachers attempt to carry out their tasks. Other researchers have followed Smith's lead assuming that no overall theory is practical. They prefer to study a specific teaching procedure or to apply a specific metaphor in the hope that when more data are available they will be able to propound a general theory. The result of this approach has been the production of a number of definitions of what teaching is. Such definitions range from specific ways in which the teacher does his work--e.g., telling, explaining, guiding, directing, questioning, motivating, and evaluating--to very general approaches in which the teacher is seen as one who by various means changes the behavior of others. One needs only to refer to the AERA Handbook of Research on Teaching (N. L. Gage, (Ed.)), 1963) to see the vast literature that has been accumulated in this area and also to see how little has been done in putting the bits and pieces together.

What one can say, at best, in summarizing these definitions is that teaching is whatever the teacher does. This conclusion is often reached in defining intelligence and obviously gives us as little help here. Progress is being made. But many feel it is not enough, and that, though we know a good many isolated facts about teaching, we still cannot describe good teaching so that it can be passed on to others in any sure and meaningful way. Fattu (1964) makes a statement which summarizes how many educators feel about this lack of specific knowledge.

"It is commonplace but not very flattering to this commentator, to deplore the fact that more than half a century of research effort has not yielded meaningful, measurable criteria around which the majority of the nation's educators can rally."

If there is one trend in teaching which stands out from all others, it is the trend toward individualization of instruction. If we accept this direction, we must immediately revise our perception of the teacher's role. The school must now become a center of inquiry and the teacher no longer acts as the gatekeeper of knowledge. He essentially becomes an advisor and facilitator. This suggests that the effectiveness of the teacher will be determined, among other things, by his ability to sequence subject matter so that it relates to the student's level of development.

Another point that needs to be made here is that very little evidence exists to indicate relationships between theories of learning and theories of teaching. One of the few attempts to bring about such a relationship is illustrated by the development of programmed instruction. While Skinner would not agree that his work comprises a learning theory, it is nevertheless true that his work on the principles of reinforcement has had considerable impact on the way in which we look at the teaching-learning process.

Facets of other learning theories can also be used to derive specific teaching strategies. For example, we know a good deal about such factors as remembering and forgetting, concept formation, language development and so forth, but these are parts of theories which form only low-order relationships between teaching and learning.

Perhaps the best that can be done at this point is to do as Gage and Unruh (1967) suggest and that is to look at teaching-learning relationships in a microscopic way. Thus we manipulate teacher variables while controlling pupil variables and look at their effects on small units of pupil behavior. Gradually we build up our supply of data on these low-order effects and then proceed to study more complex interactions.

This all-too-brief survey has been intended only to set the stage for a number of summary statements. Teaching methods--methods such as lecture, inquiry, etc.--are thoroughly discussed in the text books and will not be reviewed here. Rather, I should like to make a few brief points about the nature of the teaching function. I will also indicate some problems that may arise as well as some of the ways in which these problems can be handled effectively.

1. The move toward the individualization of instruction means that the teacher will no longer function primarily as a subject matter specialist. Rather, teaching will be a process of guiding and facilitating. Thus, the teacher must become a master of those teaching strategies needed to facilitate all kinds of learning. In addition to an increased emphasis on method he will also need to be increasingly well informed about both the content and structure of his discipline so that he can assist each individual to abstract important concepts from that discipline and store them in memory in such a way that they may be effectively retrieved when required.
2. The increasing use of media will continue to affect the role of the teacher. In an attempt to use economic

resources more efficiently computer-assisted instruction and various forms of programmed instruction will be expanded. Though this form of teaching-learning has many problems associated with it--for example, it can lead to correct verbalization rather than understanding--,yet it can clearly be a real boon to the professional teacher who can now be freed to devote himself to providing higher level learning processes for his students. The problem is in how and when to use these means of instruction.

3. Teaching will increasingly become a research process as more and more teachers become involved in evaluating the effects of their efforts. Every teacher coming into the profession must be trained not only to carry on research but also to evaluate and put into practice the research of others. A lack of understanding of research methods and results and difficulties in communicating these to teachers in the classroom has made it difficult to bring research findings into practical classroom use. We cannot depend on "expert" researchers to do this job alone.
4. Research will devote itself first to what Gage (1963) has called the micro criteria of effectiveness and gradually build on this until the effects of various strategies on various types of pupils are known. There is a good deal of common-sense knowledge of teaching, but beyond this there is also a large reservoir of research data available about specific aspects of the process that need to be verified and evaluated. For example, Smith (1960) has delineated some of the strategies and operations in teaching; Flanders (1960) has discussed the problems of classroom climate; and Medley and Mitzel (1963) have developed effective scales for evaluating teacher behavior in the classroom. It is necessary to synthesize these findings by applying them to classroom situations and subjecting the results of trial to rigorous analysis.

Research on teacher behavior itself must be carried on in a more rigorous way. According to Medley and Mitzel (1963) adequate research must be qualitative; it must take place in the classroom; and it must concern itself with observable teacher behavior. Such research will identify behaviors that teachers-in-training can be taught.

"The fact is that very few of the things teachers do in classrooms today are done because they have been demonstrated scientifically to be effective ways of behaving. An honest appraisal of the content of teacher training would reveal that it does not resemble the rigorous quantitative set of laws which form the substance of the training of architects or engineers as much as it resembles the treasured store of traditions passed on by one witch doctor to another. No doubt the

principles followed by teachers have more validity than those followed by the witch doctor, but both are based on the same kind of evidence. Indeed, many educators openly express the conviction that teaching is a mysterious, almost magical process which nobody understands or can hope to understand thoroughly. Possibly much of this lore is perfectly true--we are not yet in a position to advocate that any of it can be thrown out. But progress comparable to that seen in the physical sciences can only be achieved when teaching becomes a science." (In A.A. Bellack ((Ed.)) p. 82)

5. If the school of the future becomes increasingly oriented to the study of values, then not only will education become individualized, but it must also become personalized. While such techniques as T.V. lectures and programmed instruction may facilitate large-group instruction, the teacher will act as small group leader helping pupils to develop sensitivity, communication skills, and the ability to solve problems in groups. This suggests also that teachers will themselves need to be specialists in communication skills and group processes.
6. With a little effort teachers may in the future become experts on the process of teaching. Although it is clear that more and more people will be involved in selecting content, the teacher must eventually come to the point where only his colleagues can question his skill as a professional teacher. One way in which he may be helped to reach this level of competence is to ensure that his pre-service training is increasingly based in the actual place where he will do his work--that is, he must spend a great deal more of his time studying the teaching-learning process in the school setting.

Briefly, what I have said is that teaching is a powerful psychological force; that it can be used in such a way as to help pupils maximize potential for whatever purposes society may set; that we have a good many clues as to how good teaching can proceed; that in the future increasing emphasis will be on the teacher as a person and as a skilled user of communication skills; and that research must now involve practising teachers in applied situations so that teacher behavior will itself become scientific behavior.

Learning

Although research has provided us with considerable data about the specifics of learning and about how learning may be maximized, no overall theory of learning has yet been propounded which neatly encapsulates the relationships between input, throughput and output variables. The current condition is perhaps best illustrated by the controversy regarding the inquiry versus the lecture modes of teaching-learning. Time does not permit a thorough comparison of these modes here, but a review of the research indicates no substantial difference in the amount learned by pupils exposed to either of them. This lack of difference is, of course, partly due to the way in which measurement is carried out. Although seriously questionable, the usual procedure is to set up two groups taught by two methods and then to administer the same criterion measure to both. The criterion measure now reflects only the extent to which content has been "covered", or the way in which the two methods are alike, and ignores

completely other effects or the ways in which the two methods differ.

How do children learn best? Bruner (1966) supports the use of the discovery method on the premise that it allows pupils to organize the subject matter under study in their own way. Thus, they store the material in such a way that they can later retrieve it and use it in new situations. Learning for Bruner is an idiosyncratic process.

A contrary view is taken by Ausubel (1967) when he defends "meaningful verbal learning." He feels that it is more efficient for the expert to structure the subject matter in a logical (disciplinary) way. The pupil then stores this body of information and digests it, thereby having at his command a prestructured, logical source of data for the solution of future problems. In essence, the position taken by Ausubel holds that it is inefficient for pupils to have to sort out volumes of information when such information can be had in pre-digested form. The question--largely unanswered--is whether the discovery method does result in a more usable form of storage than does the so-called lecture method.

Other researchers have tried to bring the problems of teaching methods and learning variables together in some sort of eclectic approach. Perhaps among the more comprehensive of these is that proposed by Gage (1964). His first task was to set up goals of education. These ranged from understanding of self to preparation for living in a world of rapid change. He then summarized the various forms of teaching behavior which could best achieve these goals and the kinds of learning theory that would best describe how the pupils learned the material. He concluded from his models that certain theories could describe certain learnings and that these could be used to design teaching strategies. For example, some

kinds of cognitive goals related to specific knowledge can best be achieved by lecture--that is, conditioning--or reading. On the other hand, attitudes can only be changed by discussion techniques based on modelling theories of learning.

All of these models have some basic weaknesses. First of all, they are capable of describing learning in a post hoc way. That is, we can tell how certain pupils learned certain things after they have learned them, but we cannot tell how other pupils will learn them best. Without the ability to predict how our methods will work, we can choose strategies only on a trial-and-error basis.

A second problem relates to mental correlates of subject matter organization and practical problem solution. For example, the work of Bloom (1956) on the cognitive domain of intellectual functioning has had considerable influence in this province. Bloom and his co-workers attempted to set up some hierarchy of objectives which they felt would produce a variety of questioning procedures and intellectual climates in the classroom. Many people have been lead to believe that there are mental processes which parallel the levels of the hierarchy--that is, pupils have or can develop application, synthesizing and evaluating abilities. There is, unfortunately, little evidence that this is the case. The work of Gagne¹ (1965) -- an attempt to classify kinds of learning and relate them to types of subject matter--can be treated in much the same way.

The gist of the argument here is that we simply know very little about the way children think. As a result, no one way of teaching children can be supported.

A third problem, overlooked largely by the writers noted above, is

that of taking account of the entering behavior of pupils. If we could be assured that all pupils came into a situation with the same requisite behaviors, then laws of learning might be generalized more readily. It is partly for this reason that psychologists have for so long devoted themselves to the study of rats and pigeons whose heredity and education they can control.

We see, then, that a number of researchers have concentrated on deriving models that describe the learning process; others have been trying to devise and compare techniques for presenting the learner with certain stimulus materials; still others have been concerned about the way in which knowledge develops in the mind of the child. That is, how does thinking develop? Is the process the same for all pupils? Are there readinesses which must be developed before a new level of cognitive achievement can be reached? These are some of the questions to which Jean Piaget has addressed himself. The findings now seem to be fairly clear. Thinking does develop in an orderly fashion. The rate of development differs for each person, but mastery of each successive stage depends on success in previous stages. If the cognitive development of children can be described, then a great deal can be done to match the subject matter content to individual capabilities. It is precisely this sort of match that educators have been seeking. The descriptive work of Piaget is just now entering the curricula of teacher training institutions. The possibilities of matching content to development now becomes practicable and research on a broad front in developing the means for doing so mandatory.

As a result of the research described above we know a good deal about a number of features of the teaching-learning process which can

facilitate or hinder pupil learning. About these principles or guides

Combs (1965) says:

"The knowledge we have about learning has been acquired in the same painstaking, carefully controlled kind of experimentation which has made possible the great advances of the other sciences. It is composed of facts and principles about an important human process and it deserves the same respect and understanding as any other body of scientific knowledge."

(p. 52)

"The principles of learning can no more be suspended than any other scientifically derived understanding. They continue to operate whether we are aware of them or not. If we ignore them, we do so at the risk of making our teaching haphazard and ineffective." (p. 52)

In the interests of clarity and conciseness I shall summarize what I feel are the major issues and trends related to learning.

1. Many pupils hate school because it does not provide them with what they want or feel they need and because for many it is a punishing experience. The solution to this problem seems to be to allow them to study what they want to study. This kind of "fuzzy" curriculum is unacceptable to many. Surely pupils will always need to have certain skills and knowledge. The problem is really one of motivation, for ultimately the pupil does control how, what and when he learns. If this is the case, we should devote more effort in the future to helping him to see the value of certain skills--unfortunately some of these may not be readily demonstrable--and developing reinforcement techniques which will help him to keep motivated for the task. Many pupils get an education despite home conditions, neighborhood problems, and even despite schools that ignore all the hard work of curriculum constructors, research workers, and psychologists! What remains is the "pay-off" for getting an education, and the schools have failed largely because this pay-off is just not visible. It is not inconceivable, for example, that work experience would be a useful adjunct to the curriculum in order that the pupil may see what it is that he needs to master.
2. Because the world is complex, learning will be branched more and more. Much of what is to be learned as raw data

can be provided by machine or other forms of non-individual instruction. I think it would be dangerous, however, to depend on only this form of learning. At times the individual must work as a group member in order to learn the techniques required to solve problems related to a group.

3. It seems likely that in the future pupils will assume more control over planning their own progress. This is predicated on the concept, now fairly well established, that ability to proceed in school is not based primarily on general ability as measured by a test. Learning is a function of time. As teaching-learning becomes more individualized, the pupil will more and more be able to proceed at his own rate in every subject area. One of the major problems for the teacher here is the testing and record keeping. This job will be increasingly taken over by the computer leaving the teacher free for planning and individual and small-group instruction. The emphasis will thus move from planning a sequence to match the structure of a subject or discipline to diagnosing and prescribing.
4. The "what" of education will become a confusing problem. This problem has been discussed in other papers written for this Commission, but it seems worthwhile to point out here that current trends suggest that communication and the development of a sense of worth will be major emphases in education in the future. The techniques for achieving these goals are largely undiscovered. One possible answer is increased diversity in allowing pupils to learn in various places and by various methods. By doing this we give up control of the curriculum but we also allow many people to get more education and we allow a good deal of experimentation.
5. Current curricula favor pupil learnings which have long-term effects. It is difficult to see how these more global goals can be achieved by some of the traditional subject matters. For this purpose new areas of study, particularly in the social sciences, will need to be developed, and research will need to be undertaken to determine if these long-term effects have been achieved.
6. The use of drugs will become an increasingly important phenomenon. Even if drugs are not developed which make people "smarter"--and this is being done--they certainly may be used to alter personalities. Here we face a philosophical problem related to learning.
7. Because learning can, and frequently does, take place without formal teaching, pupils will increasingly be educated by other means. The fact that programmed instruction, television teaching and computer-assisted

instruction often fail to motivate the learner, however, is a problem which must be faced immediately. This is a problem which involves learning to learn and suggests that we need to devote effort to the development of new roles for both learner and teacher.

It is my impression that research will continue to devote itself to the study of developmental stages and their relationship to individual conditions of learning. Efforts will continue to be made toward studying the gross aspects of the educational system such as pupil- versus teacher-centered classrooms, creativity of pupils, motivational settings, etc., but until the specific aspects of the learning process are known, no comprehensive theory of learning will be developed. To this end immediate steps should be taken to follow up the work of Piaget. The Nuffield Project in mathematics is a good example of such work. The major emphasis in this project is on determining check points in the progress of the children as they proceed to deal with the concepts of the course. The aim is to find out at which stage of development each child is and then to devise learning activities accordingly. While Piaget has provided us with a broad outline of the way children's thinking develops, it is up to us to determine how these developmental sequences apply to the curriculum. Comprehensive, well articulated research is needed here as never before because the task is an immense one which can never be achieved by a few. It seems sufficiently promising, however, so that whatever funds can be devoted to it will probably not be misspent.

Evaluation

Models which attempt to portray the teaching-learning process usually include some sort of feedback loop. In so doing they indicate the need for constant data collection which can be used to adjust the program to meet the needs of its clients. Evaluation is currently meeting with considerable resistance in the schools, and if evaluation is only a matter of "getting" marks for the purpose of filling spaces on a report card, this resistance is justified. On the other hand, data derived from carefully planned evaluative procedures can provide a major link between teaching and learning and, beyond this, with curriculum content.

If, with MacDonald (1965), we consider education as a system, then we can classify the educational endeavour into several sub-systems to which evaluation can be applied. These subsystems are: (a) learning as the desired response; (b) teaching as the presentation of stimuli; (c) instruction as the total setting in which stimuli and desired responses occur; and (d) curriculum as the source of stimuli. How can each of these sub-systems be subjected to evaluation?

Evaluation of the extent to which individual pupils learn a specific content has had a long history which will not be traced here.

The controversies over the relative merits of essay examinations, true-false items, multiple-choice items, and even giving tests in the first place are well known. Research has provided considerable evidence about these problems, but the point is that useful evaluation, however it is made, must provide useful information about one thing--that is, the extent to which a program has achieved its aims. The usual procedure in good

practice is to set behavioral objectives, choose a teaching strategy, and then evaluate by means of a test, carefully designed to reflect the objectives, what has been learned. The problem is that most teachers have great difficulty in setting instructional objectives which they feel are meaningful and really describe what they are trying to do. In fact, there is growing agreement that where so-called behavioral objectives are used the teaching becomes sterile. This may be because of the difficulty of expressing high-level objectives in behavioral terms or because, in fact, objectives of this nature appear to be somewhat trivial--that is, they lack face validity. This can be corrected to some extent by the introduction of objectives set up to achieve affective as well as cognitive goals and by helping teachers in setting more appropriate objectives.

Another problem revolves around the business of assigning grades for reporting purposes. Report card formats come and go. Pass-fail systems have had little success, probably because teachers, administrators, employers, and even students feel they must have some fairly exact measurement on which decisions can be based. The use of standardized scores, although supportable on rational and statistical grounds, has failed to win wide support mainly because of the difficulty of explaining their implications to parents and the public at large. Letter grade systems, though they appear to incorporate the best of two worlds, are usually attacked on the basis that they do not differentiate sufficiently. Additionally, all of these absolute systems of evaluating and reporting pupil progress are at odds with the concept of individualized instruction because they are primarily based on competition. In general, then, reforms of the marking system have failed, even though experts in the field of measurement have

demonstrated conclusively that any form of raw-score reporting is illogical and misleading.

Whatever the solution will be to this problem, it is clear that evaluation of learning must be based on the objectives set forth in the total plan.

" . . . the marking system is something external to the design of instruction. It has been created for use outside the teaching situation. For the careful design of instruction the teacher must have more detailed knowledge of entering behavior and terminal performance than marks usually convey. As a public record marks have obvious utility. As a means of assessing entering behavior and the effectiveness of instructional procedures they have obvious limitations." (DeCecco, p. 651)

The computer will, of course, be used more and more in the evaluative process. It is possible by its use to set up a bookkeeping system so that the teacher is released from the chores of selecting items, preparing tests, scoring and reporting. Marking can then become true evaluation which will reflect individual pupil progress rather than indicating how well a given pupil, prepared in a given way, can keep up with the group in which he has been placed. In other words, relative rather than absolute evaluation will be possible.

Evaluation of teacher effectiveness and of the classroom as a unit have continued to be thorny problems. Most evaluation is based on what is thought to be good teaching practice. Thus, teachers are divided as "good" or "poor" on the basis of the achievement of their pupils or on the basis of ratings made by supervisors, peers, pupils, etc. In some studies the behavior of the teacher is inferred from some more global measure such as classroom climate or pupil-teacher interaction. The evaluator then looks for differences that can be related to achievement or other relevant variables.

The results of such studies have been disappointing because results indicating that given variables make a difference in one study cannot usually be replicated in further studies.

Biddle (1967) discusses the methods and concepts in classroom research. He points out that most studies in the area of teacher effectiveness use as their base a limited model of classroom interaction. They pay attention to only one class of variables at a time. This is an understandable weakness when one considers the complexity of the task. What is obviously needed is a broad attack on the problem in which new models are devised--models which contain common definitions that can be used by all researchers. Statistical designs to fit research based on these models are required. These will also be of a multi-variate nature.

Finally, there is the problem of evaluating curriculum content itself. The questions are "What shall we teach? What do we expect to achieve? What stimulus materials shall we use? Are our aims being achieved?" The question becomes increasingly important as we realize that more and more people are becoming involved in planning curriculum. If, as has been predicted, other agencies besides the school become responsible for education, the question of how to compare one curriculum with another becomes an urgent one. Abramson (1966), in reviewing the process of curriculum evaluation, states that the basic problem is that of finding an overall design for such a project. At present little has been accomplished in this area.

Having indicated current conditions regarding evaluation of teaching and learning, I should like to summarize by making some statements about where I think attention in these matters should be directed.

1. Emphasis in the future will move more and more to the affective goals of instruction. The subject matter on which such goals will be based will probably be derived from current problems in the culture. The long-term effects of such studies must be determined and teaching methods devised so that specific skills can still be accumulated by pupils.
2. Reporting pupil progress will become a matter of recording individual levels of achievement. Reporting techniques will indicate what a pupil has mastered in a specific subject matter area not the extent to which he has mastered what a group is doing. Another way of saying this is that ipsative rather than normative scores should be used. They will also indicate how well he has mastered specific skills. Such factors as attitudes and motivation will be taken into account as non-cognitive (affective) goals become a part of instruction.
3. The computer will be utilized as a record-keeping device and will be able not only to provide current status reports on each pupil but will also be able to supply guidance as to what the individual must do next in order to balance his profile of achievements.
4. Teacher effectiveness will be determined not only by checking against lists of competencies or by evaluation of lecturing skills but also by ability to communicate with pupils in dealing with them on a one-to-one basis or in small group situations.
5. Research in teaching-learning must be devoted to multi-variate analyses of data obtained in actual school settings. It is important that teachers become involved in both the selection of the problems to be studied and in carrying out the actual research.
6. The evaluation of curriculum content will be placed in the hands of a number of people. The content of the curriculum is not strictly a matter for choice by those within the profession. Probably the best solution is for the expert in a discipline to help select content for instruction in that discipline while other curriculum content is chosen by the pupil himself and by representatives of the community at large. This implies an eclectic approach to curriculum planning which poses many delicate problems that cannot be outlined here. It also implies that a new expert--the evaluator--must be added to the teaching team.

Implications

There appears to be no doubt that a revolution in education is taking place. The general feeling that the schools have failed--largely because of the criteria that have been chosen for success--is epitomized by the articles on "Education in the 70's" in the Saturday Review of September 18, 1970. This feeling of failure, despite the fact that large sums of money have been devoted to education, coupled with other trends in society, will result in increasing demands for change in education as in other institutions. It follows that widespread changes may produce side effects which cannot immediately be measured. It seems necessary, therefore, to delineate some possible dangers which may develop so that we may direct our attention to them. Some of these dangers are suggested by Kahn and Wiener (1967) in their attempt to describe some of the multi-fold trends which threaten our society.

"An overemphasis on education can result in shallow intellectualism; Mandarinism (the intellectual as 'father and mother of his country'); an overemphasis on 'book learning' (conceptual world and documented information rather than existential world and perceived orally or transmitted information); an expansion and prolongation of the adolescent subculture; a meritocracy; excessive theorizing, intellectual and/or educated parochialism; alienation from one's own culture or subculture; and other alienation from the practical world." (p. 64)

The pattern of setting up possible polarizations of cause-and-effect relationships seems a useful one in suggesting possible problems, and, at the risk of being repetitious, I should like to consider a number of these as they may relate to teaching, learning and evaluation.

1. The decade of the 60's has been largely devoted to recovering from the onslaught of Sputnik. In the schools this meant an emphasis on the physical sciences and other technical skills. The emphasis in the 70's may very well be on the social sciences as a backlash against mechanization takes place. Clearly a lag has developed in the social sciences and the danger is that the pendulum may now swing too far in the opposite direction. This swing is probably best illustrated in the actions of modern youth who show signs of being alienated by education. This alienation may take a number of forms ranging from apathy, in which case they merely swallow the educational pill, to outright revolt, in which case they make demands for more relevant education and for a more active role in educational planning and administration, to a flight from reality, in which case they may take up the hippie life or drugs, or resort to some other form of escape. While it is not really difficult for educational institutions to grant many of the requests made by students, it may be difficult to keep education from becoming an anti-intellectual activity.
2. What will happen in the 80's and beyond? The best prediction seems to be that emphasis will move to preparing people for the fruitful use of leisure. Suggestions as to how this will be accomplished are vague. Perhaps one solution is practical and that is that we use more and more people as teachers. Such a solution makes a great deal of sense when we consider that more and more people will need to be in school longer initially and that large groups of people will need to be re-trained. Such a pattern has already been established in the business world where retired executives are used as advisors to those setting up new industries.
3. There is evidence of a breakdown in other institutions such as the church, the family, and the neighborhood. Should this trend continue, and should the school be in a position to take up the slack, changes will need to be undertaken in the school structure itself. Such changes are already evident in efforts to individualize instruction and through efforts to bring about curriculum revisions which place an increasingly greater amount of emphasis on current problems of youth. The danger, of course, is that individualization may lead to depersonalization or "de-socialization." We obviously cannot afford to allow individual problems to blind pupils to problems which affect whole groups of people. We can also not afford to lose sight of those skills which all pupils need to develop as they pass through the educational system.

4. The "what" of education poses a real problem. The school has often been thought of as an unchanging, monolithic system which forces pupils to learn what others decide is best. A revolution is underway in this area too. In a book published recently, Postman and Weingartner (1969) suggest that teachers should undertake the subversive activity of restructuring the schools and the curriculum so that students could pursue "relevance." Their conclusion is that the aim of the schools should be to help pupils develop a "built-in, shock-proof crap detector." In the face of the current knowledge explosion, this appears to me to be a rather simplistic way of solving the problems related to pupil interest and motivation. If we over-emphasize the concept of "relevance" in education, I predict that we will experience a "humanization" backlash. I suspect that we will in the next few years introduce all kinds of trivial problems into the curriculum just to make the pupils happy. Now there is nothing intrinsically wrong with making pupils happy, but we can carry group discussion of "relevant" problems to the point where it becomes nauseating. By all means let us make learning relevant, but let us make certain that it is also useful. While pupils respond with interest to current problems, there is no doubt that they can also deal with pre-selected materials which are made meaningful to them. What we need are ways of presenting material not just of selecting it.
5. The problems of individualization and personalization are already evident. In the face of bureaucratization, specialization, national systems of education--which is in itself an anachronism--and growing institutional complexity, it is difficult to see how individual identity will be maintained. Instruction may become individualized, but whether it will be personalized or humanized is another question entirely.

Mass processing may result in the break-down of the relationship between teacher and student. Students are greatly influenced through involvement and identification with other individuals and groups--that is, emotional interaction is of major importance in a learning situation--, and this kind of interaction is best obtained by face-to-face contact with others. An example of the loss of such contact is given by Clark (1962) when he discusses the topic of television teaching.

"Educational television, in this matter, has many pros and cons. The televised lecture or demonstration can reach large numbers of students economically; such programs generally have excellent teachers and hence represent an efficient use of scarce talent; the televised performance is often a dramatic demonstration,

utilizing techniques too expensive for the individual classroom, and hence can better excite and stir students; and educational TV in the classroom can have the side effect of invigorating the classroom teacher through the intrusion of the knowledge, methods, and personality of the televised instructor. Educational TV is apparently effective in transmitting technical information, explaining concepts through dramatic demonstration, and presenting adult models of considerable personal appeal." (pp. 284-285)

Also:

"... there is ample doubt, on grounds of the psychological and social conditions of influence, whether mass processing can develop in students the broader understandings necessary for civilized men in a complicated civilization. Independent judgment, humane sensibility, an understanding and appreciation of subtle human affairs have long been taught, if at all, by the close interaction of a teacher and a small group of pupils or disciples. These central attributes of educated persons seemingly require prolonged influence by capable adults who are close enough to the student to act as model and mentor; or, to require a situation where the involvement of students in their work drives them, through mutual stimulation, to higher levels of understanding and greater maturity of judgment. Students can educate one another, but only when they are frequently accessible to one another." (p. 283)

Another problem which is already in evidence here is related to the use of the computer. Those of us who have been involved in such simple things as registering students by computer are aware of the powerful feelings that can be generated by I. D. numbers, errors in scheduling, and print-outs of various kinds of messages. A whole new attitude on the part of programmers and receivers needs to be developed if we are to see the computer as servant instead of master. What I have said of computers can obviously be said of the media in general, so I will make no further reference to them.

6. The university, too, is experiencing an important problem in defining its role. While its traditional role was that of teaching and providing leadership in research, it appears

now to be more involved in training research workers. That is, it is becoming more and more a center for vocational preparation, a trend which may in itself have significant implications. At the same time there is a great desire for "meaningful" studies, and many people have been deluded into believing that a university degree in areas of study "which interest them" will be a sufficient vocational preparation. The business of taking one degree as a preparation for living and another as preparation for work is not satisfactory. The role of the university in job preparation must be clarified.

In general, then, I think the schools are heading for real problems in the years ahead. Problems will arise as to what should be learned, who should do the teaching, how material can best be learned--at the lowest cost in terms of effort, time and money and without regard to side effects--and how to evaluate such learning. Pupils will become disillusioned; teachers confused; and parents will despair of getting an education for their children. School boards and tax collectors will become dismayed by the rising costs of trying to accommodate all of the aspects of education that will require attention.

If I have rather strongly emphasized the problems which face us in education, I have done so for a purpose. The purpose is to show that we cannot proceed to the invention of new programs and procedures and the adoption of new curricula without reference to their effects. There is much knowledge that is not being used and it seems that it would be best to put this knowledge to use in evaluating proposals for change. What I am proposing, therefore, is that we devote research not only to the development of new ideas but to interpreting these ideas in a practical way. What research can we undertake that will be meaningful and that will prevent or at least ameliorate the problems suggested above?

Research must continue to study the variables related to teaching and learning and the effects of interaction among these. At the same time we need to have research devoted to interpretation of what is happening in the school situation--that is, studying and supporting what is currently

included in the curriculum. This area of research is required to make sure that the results of research become a part of practice and that practice which is instituted is constantly evaluated.

Perhaps there is a consideration which is even more important than that mentioned above. It seems quite certain that if we expect to move from State A to State B, it is necessary to involve all of those who are responsible for education. This means that change must begin with the teacher, and the difficulty of involving teachers-in-service in change is well known. Educators in general seem to find it difficult to introduce changes that the research suggests. In fact, one must note with sadness that change does not come about as the result of research at all, but rather, as Chall (1968) puts it, it comes about as the result of new money and technological change. An example of this kind of failure is given by Coopersmith (1967) when he points out that we know that failure leads to more failure and yet our schools continue to fail pupils because it is obvious that some must fail. If I were to place my money in education in any one place, and if my aim was to improve teaching and learning, I would set up some sort of demonstration center. Teachers cannot be expected to try new methods after reading about them. It is necessary to provide them with situations in which they can practice specific techniques and see them demonstrated. This is so if new techniques are to become a part of their repertoires of behavior. Similarly, the social sciences have been unable to contribute a great deal to education because schools are not like the labs in which they operate. Therefore, a clinical, research type school where educators and researchers can work together and where new teaching methods can constantly be attempted and observed seems necessary. Objections

to this type of center may be made by some on the grounds that children in such schools may suffer. Such fears are probably groundless; in fact, I suspect that they would be highly motivated and would do very well. Such demonstration centers could also provide the teachers' information service and field assistance proposed in the ATA (1970) submission, Teaching and Learning/1999.

Research is also needed in the use of the media and teaching techniques involving the use of programmed instruction, television, and the computer. It is no longer necessary to prove that these procedures work but rather to devote effort to discovering new ways of using them to maximize learning.

It is also likely that research on teaching special groups of children can gradually be reduced. There seems no good reason at this point why improved teaching and learning methods cannot be applied to all.

In the same sense it is necessary to look for new metaphors to describe teaching and from this to develop new models on which to base research hypotheses. I have already suggested that it is very difficult to study teaching per se. For the present a pluralistic approach to method is needed with research devoted to evaluation of the outcomes much in the way a consumer's research organization operates. Studies of aspects of teaching and learning may eventually lead to an adequate description of the teaching-learning process, but in the meantime a variety of curricular content and teaching modes must be selected and evaluated. Popularity and advertising alone should not be used in choosing curriculum content and teaching method.

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